

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Service Division.

The following summaries relating to the general weather and crop conditions during October are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon voluntary reports from meteorological observers and crop correspondents, of whom there are about 3000 and 14,000, respectively:

Alabama.—Favorable for gathering staple crops, but too dry for late cotton and minor crops; general killing frost on 25th stopped further development of cotton, bulk of which is picked, yield slightly better than anticipated in a few places, but generally below average; all will be gathered by November 15; good yield of corn housed; little oats and wheat sown.—*F. P. Chaffee.*

Arizona.—Over a large part of the Territory no rain whatever fell during the month; rain fell at stations in the northern, central, and western portions early in the month, but the rest of the month was dry. Notwithstanding dry weather the feed on ranges continued good, and cattle were in excellent condition, but the supply of water in wells and streams was diminishing rapidly.—*M. E. Blystone.*

Arkansas.—General heavy to killing frosts on the 24th and 25th. Favorable for gathering crops; too dry generally for fall plowing and seeding, except in northern and middle-western portions. Cotton opened slowly, retarding picking; crop about half picked at close of month; frosts latter part of month caused premature opening. Corn about gathered, early, average yield; late, light. Sweet and Irish potatoes good crops, harvesting general at close of month. Less than usual acreage sown to fall grains owing to insufficient moisture for plowing and germination. Some wheat, oats, and rye up to good stands in northern portion. Stock generally thrifty although there was some complaint of cholera among hogs.—*O. C. Burrows.*

California.—The weather was generally favorable for raisin making, fruit drying, and maturing late grapes and deciduous fruits. Rain during the first part of the month caused but slight damage to raisins, as ample warnings were given, and there was but little injury to beans and other exposed crops. Forest and field fires in southern California caused considerable damage. Unusually heavy fogs were frequent along the coast. The temperature was abnormally high for a few days about the middle of the month.—*Alexander G. McAdie.*

Colorado.—Conditions favored the ripening and harvesting of outstanding crops and fruit, but were too dry for plowing, especially in eastern counties, where seeding made slow and difficult progress; a small acreage of wheat and rye was sown, mostly on unplowed but cultivated or harrowed soils, much of this remaining dormant. The general precipitation at the close of the month no doubt proved favorable to additional seeding and germination. The harvest of sugar beets, potatoes, and winter vegetables made good progress, but about one-half of the beet crop was still in the fields at the end of the month.—*F. H. Brandenburg.*

Florida.—The conditions were favorable for harvesting the last of the cotton crop, but altogether too dry for fall vegetables and seeding for winter truck, except on lowlands where germination was good. Heavy to killing frosts during the last decade were an advantage to citrus fruits. Grinding cane continued; the crop was a fair one. Pineapple slips did well; small shipments were being made. Orange shipments were increasing.—*A. J. Mitchell.*

Georgia.—The weather was favorable for securing late crops, but fall plowing and seeding were delayed owing to the general dryness of the soil. Cotton picking was practically completed at the close of the month, with yield below normal. A destructive frost occurred over the northern section and in portions of the middle and southern counties on the 25th, destroying cotton plants and other growing vegetation.—*J. B. Marbury.*

Idaho.—Weather cloudy and rainy from the 1st to the 6th, inclusive, and on the 9th, 10th, and 11th; on the 12th began a period of bright and pleasant weather, which continued almost without interruption over the entire State till the 27th, after which light precipitation became general on the 28th and 29th, followed by much cooler weather. Late farm work progressed rapidly during most of the month.—*S. M. Blandford.*

Illinois.—The month was warm until the 7th, when a fall below the seasonal average temperature occurred. Another warm period began with the second decade. The coldest periods obtained on the 18th and 24th, when killing frosts occurred in the northern and central districts, respectively. Weather conditions were ideal for farming operations and corn matured beyond expectations. The crop was practically safe before the advent of killing frosts. Early sown wheat was showing well, but late planted needed rain. Pastures were in good condition, except in the southern district.—*William G. Burns.*

Indiana.—Lack of moisture retarded fall plowing and the germination of seed in the south section; conditions were more favorable in the central and north sections, but wheat was small and made slow growth. Corn was practically all safe from injury by frost before the 15th, and the last half of the month being dry, with frequent frosts, the grain

dried rapidly. Apples and potatoes were mostly harvested, both crops being light. A heavy crop of tomatoes was saved during the first half of the month.—*W. T. Blythe.*

Iowa.—October was very favorable for maturing belated portion of corn crop and drying it out preparatory for early cribbing. Earliest killing frost occurred on the 18th, and the percentage of soft corn will be but little more than usual. Amount of fall plowing above the average. Conditions were fine for harvesting potatoes, apples, and all late maturing crops. Potato crop generally below average. Vegetables and forage crops extra good. Fall wheat and rye made fine stand.—*John R. Sage.*

Kansas.—Corn matured well with ears well filled; husking began in the northern counties. Wheat about all sown, except in the western counties, where the ground was too dry until the fine rains of the last of the month. Most of the wheat was up; a good stand, looked fine; some was pastured. Abundance of forage was raised and most of it secured in good condition. Pastures were good.—*T. B. Jennings.*

Kentucky.—First of month warm and showery and plowing and seeding progressed rapidly; rest of month dry, retarding germination and growth of wheat. First general killing frost on the 18th. Corn yielded well, considering damage from drought. Tobacco saved in fine condition; yield fair. Pastures badly dried and stock water scarce, but stock generally in good condition. Turnips, late potatoes, and other fall crops generally poor. Winter apples averaged poor, but were good in places.—*S. P. Gresham.*

Louisiana.—Dry weather checked the growth of cotton early in the month and prevented the development of a top crop. Heavy, and in some places killing, frosts from October 24 to 26 completely stopped the growth of the plant and caused matured bolls to open rapidly. As a rule, conditions were exceptionally favorable for picking which was finished or nearing completion at the close of the month except in a few localities. The yield was very light in some localities and was generally below the average. The growth of sugar cane was retarded by dry weather, and as a result a light tonnage was reported. Cool, dry weather favored ripening and a good sugar content was indicated. Rice harvest was finished under favorable conditions. The bulk of the corn crop was housed during the month. Truck gardens suffered from lack of rainfall.—*I. M. Cline.*

Maryland and Delaware.—Considerable damage by frost in extreme west. Corn mostly in shock at the end of month, being still to green to crib; yield light to fair; fodder good. Heavy rains from 8th to 12th, together with lateness of corn crop, delayed seeding of wheat and reduced acreage considerably; early sown looking well; late sown germinated poorly. Fall sown grasses made good stands; pastures were good. Weather quite favorable for farm work.—*Oliver L. Fassig.*

Michigan.—The first decade of October was wet, delaying fieldwork and the maturity of sugar beets and late corn, but the middle and last decades were very favorable. At the close of the month corn was practically all cut and drawn. Sugar beet harvest was well advanced toward the close of the month and fair yields were reported. Winter wheat and rye seeding progressed steadily throughout the month and at its close had been mostly completed; the seed germinated finely.—*C. F. Schneider.*

Minnesota.—Much rain in the early half of the month; dry and clear in the latter half. Light and heavy frosts till the killing frost of the 26th, but hardy plants were still green at the end of the month. Threshing progressed rapidly late in the month where soft soils in the south did not cause delay. Plowing well advanced, although lowlands were generally too wet to be plowed this season. Winter rye looks well. Very little winter wheat seeded this year because of the wet season.—*T. S. Outram.*

Mississippi.—The weather was very favorable for gathering crops. Killing frost was general on the 25th. Lowland cotton opened very rapidly; in the delta many unmaturing bolls were destroyed by frost, but elsewhere the crop was too far advanced to be materially injured; picking progressed rapidly, and by the close of the month was nearly completed on uplands and well advanced on lowlands; the yield continued below the average. Corn gathering was nearly completed, with a good yield. Cane, sorghum, peas, and sweet potatoes were damaged by the drought, but yielded fairly well. Fall crops were generally a failure. No fall plowing was done. Pastures were dry.—*W. S. Belden.*

Missouri.—October was generally favorable for maturing the late corn, and, except in a few counties, where a considerable portion of the crop was very late, comparatively little was injured by frost. Except in some southern counties, wheat sowing was completed, with the soil in excellent condition, and the bulk of the crop was up and growing well at the close of the month. In some southern counties, however, considerable damage by fly was reported.—*A. E. Hackett.*

Montana.—October was notable for its mild, equable temperature, large number of clear days, and small amount of precipitation. Threshing was completed and good progress was made with fall plowing. Range conditions continued good, and stock did very well.—*Montrose W. Hayes.*

Nebraska.—In most parts of the State the month was very favorable for agricultural interests. Lack of rain in the southwestern counties

retarded the sowing of winter wheat and made germination slow and uneven, but elsewhere wheat came up well and made good growth; the amount sown was slightly less than last year. Corn ripened well, but was late, and husking and cribbing were just beginning at the end of the month. Thrashing progressed rapidly and was about finished. Pastures continued excellent throughout the month.—*G. A. Loveland.*

Nevada.—The month was slightly warmer and much drier than the average October. The weather throughout the month was exceptionally favorable for thrashing grain, baling hay, and harvesting late crops. The condition of live stock was generally satisfactory.—*J. H. Smith.*

New England.—During the second week the weather was stormy with rain, fog, and easterly winds; the remainder of the month was favorable for harvesting and housing crops, fall seeding, and general farm operations. The rainfall was deficient, except in parts of Massachusetts and Connecticut where it was in excess. The minimum temperatures occurred during the closing days of the month, falling to freezing or below in nearly all sections.—*J. W. Smith.*

New Jersey.—Abnormally heavy rains and high winds early in the month did immense damage to late crops and other property, especially in northern portion; harvesting of corn difficult; late planted not fully matured; early sown wheat, rye, and timothy good stand; much yet to sow in southern portion; pastures very good; first killing frost 24th and 25th.—*Edward W. McGann.*

New Mexico.—Almost cloudless weather during the month. Very dry excepting in extreme northeast, and deficiency of previous months made the season unusually dry there also. Ranges short, but stock generally in excellent condition, because the grass cured so well. Surface water becoming quite scarce in some south-central localities.—*R. M. Hardinge.*

New York.—First half of month too wet; latter half more favorable, but freezing weather with snow from 24th to 27th. Wheat and rye sown late, but now in excellent condition for winter. Corn much improved, but poor; most of crop saved without damage from frost. Yield of potatoes better than expected, and mostly dug. Yield of apples larger than estimated, and of excellent quality. Fall plowing not yet finished.—*R. G. Allen.*

North Carolina.—The first half of the month was generally above normal in temperature; the latter half colder, with frequent frosts. In the west the first killing frost occurred generally on the 19th, but was deferred in the central-eastern portion of the State until the 27th. The precipitation occurred in short periods, the long intervals of dry weather being favorable for gathering crops, fall plowing, and seeding of winter wheat and oats, which work made good progress. Picking cotton was completed during the month, and by the date of the first killing frost, about October 27, there was practically no more cotton to be saved; late bolls could not open and were hardly expected to mature. Gathering corn, digging sweet potatoes and peanuts, and housing minor crops were about completed.—*C. F. von Herrmann.*

North Dakota.—Generally mild, pleasant weather prevailed during the month, with temperature high enough to keep the ground from freezing, so that fall plowing was carried on during the entire month. Aside from this, no farm work of consequence was done.—*B. H. Bronson.*

Ohio.—Weather favorable for ripening corn; crop generally good in north, but injured by drought in south. Wheat germinated well in the north, where the crop was quite promising. The continued dry weather seriously affected the crop in central and southern counties. There was some fly reported in the southwest. Tobacco cured well. It was too dry for late gardens and pastures.—*J. Warren Smith.*

Oklahoma and Indian Territories.—Light to heavy frosts caused cotton to open rapidly, but damaged potatoes and bottom-land vegetation. Wheat seeding neared completion; early sown was up to good stand and being pastured in some localities; very backward in western Oklahoma, due to deficient precipitation. Cotton picking progressed with half of crop secured; a half yield promised; cotton damaged by excessive rains in localities in Indian Territory. Corn, Kafir corn, castor beans, sweet and Irish potatoes, cane, millet, and apples were being gathered; fair to good yields. Pastures continued good and stock doing well.—*C. M. Strong.*

Oregon.—During the first decade good rains fell in all parts of the State, but after the 10th dry weather prevailed nearly everywhere. The temperature was seasonable and the frosts that occurred did no harm of consequence. The weather conditions were excellent for seeding, and by the end of the month nearly all the summer fallowed and corn stubble land was seeded with fall wheat or oats. The acreage of fall wheat was much larger than last year and the grain sown early came up nicely, but that sown later was slow in germinating on account of the dry weather and cool nights.—*Edward A. Beals.*

Pennsylvania.—Weather conditions and soil favorable for harvest of late crops, plowing, seeding, and germination; early sown grain up and in excellent condition, but a large acreage was sown late; complaints of soft corn numerous; husking well under way; yield below average; potato crop better than anticipated; apples fair, other fruits scarce; pastures satisfactory; new grass fields well set and making rapid advance; tobacco backward but curing nicely. Killing frost general on the 25th.—*H. A. McNally.*

Porto Rico.—The weather was generally favorable for all crops. The older canes made good progress and were in a very promising condition.

Cane planted for gran cultura started unusually well. Planting for this crop was still in progress. Coffee matured rapidly during the last ten days of the month and picking became very active and general. The grain was of good grade. Some rice was harvested; yield poor. A small amount of cotton was marketed. The corn crop is promising, but beans have been seriously injured by heavy showers. Oranges were being shipped to the United States. The markets were well supplied with fruits and vegetables; pastures continued in good condition.—*E. C. Thompson.*

South Carolina.—Favorable for harvesting operations, but generally too dry for the preparation of land and for seeding, although considerable oats and a small amount of wheat were sown. The first general light frost occurred on the 19th, and frosts ranging from light on the coast to killing in the central and western portions followed on the 25th to 29th. Cotton opened freely and picking was practically finished except in west, where considerable late cotton had not reached maturity and some bolls were destroyed by frost. Corn was gathered and haying continued throughout the month. Sweet potatoes yielded well, but other root crops were poor. Fall truck made excellent growth, and shipments were begun.—*J. W. Bauer.*

South Dakota.—Rains in eastern portion during early part of month retarded thrashing and haying, and winds damaged some grain and hay stacks and broke down some corn; rest of month weather very favorable for field operations and outstanding crops. The month closed with considerable thrashing yet unfinished; cribbing of corn well under way, with probably one-fourth of the crop unsound, due to September frost; plowing backward; winter rye in thrifty condition; potato crop nearly secured but yields disappointing.—*S. W. Glenn.*

Tennessee.—Good rains on the 1st, 2d, and 5th to 8th, facilitated plowing and seeding, and were beneficial to unmaturing crops and pastures. The rest of the month was generally dry and cooler, with heavy and killing frosts on 18th, 19th, and 25th, which checked further growth. The month was fine for gathering crops. Seeding of grain progressed fairly well in corn land, but elsewhere the dry condition of the soil greatly delayed plowing and seeding; early sown grain was coming up. The month closed with good rains in the eastern section.—*H. C. Bate.*

Texas.—The precipitation of the month was well distributed and sufficient to keep the ground in good condition, and much wheat, oats, and rye were sown. Early sown grain was coming up nicely at the close of the month. Light to heavy frost occurred in the north portion of the State the latter part of the month, but did little or no damage. On the whole conditions were favorable for cotton picking, and but little damage resulted to lint in the fields. Rice harvesting and thrashing were generally completed. Sugar cane matured nicely.—*L. H. Murdock.*

Utah.—Cold stormy weather prevailed during the first five days of the month when practically the entire monthly precipitation occurred. Cloudless skies with temperatures somewhat above the normal followed until near the close of the month, when a decided change to colder weather took place. Light frosts were frequent, but the first general killing frosts did not occur until the 30th and 31st, much later than usual. Plowing was pushed vigorously to completion and the sowing of winter grain was under rapid headway. In many localities early sown grain was coming up. Beets were being dug with good yields generally reported. Pastures improved and stock was in good condition.—*R. J. Hyatt.*

Virginia.—The work of the month was mainly along the line of fall seeding, and for this the general weather conditions were somewhat too dry. That portion of winter wheat, oats, and clover seeded early did very well throughout the month, coming up evenly and getting a good stand. Fall pastures held up nicely. Frosts damaged late potatoes and corn. Much tobacco was hauled to market.—*Edward A. Evans.*

Washington.—Month free from early and severe frosts. Ample rain in first decade, but remainder of month dry and warm. Some damage to unthrashed wheat and oats in first decade. Weather favorable for plowing and for seeding fall wheat; much seeding done. Wheat that was up was growing nicely. Potatoes and root crops mostly harvested, with good yields. Good apple crop gathered.—*G. N. Salisbury.*

West Virginia.—Plowing progressed rapidly during the second week, and seeding was quickly completed. Wheat, rye, and oats were rather short, but were doing fairly well, considering the dry weather. Pastures were short; feeding will begin earlier than usual, but stock continued in good condition. Corn husking was in progress, and about a half crop will be secured. A killing frost was general on the 25th. Apples were all picked; a good crop gathered in the panhandle section and a fair crop in some southern counties.—*E. C. Vose.*

Wisconsin.—A tornado passed through the southern portion of Portage County on the 3d, doing considerable damage to orchards, buildings, and crops in the field. Severe local storms were general over the central counties on that date. With the exception of showers from the 15th to 17th, fair and very pleasant weather prevailed during the second and third decades. Winter wheat and rye made good progress and were in satisfactory condition.—*W. M. Wilson.*

Wyoming.—An unusually severe windstorm prevailed over the State on the 6th, doing some local damage. On the 29th and 30th a snowstorm was quite general over the State, but the snowfall was not heavy. As a whole, the weather conditions of the month were very favorable for outdoor work and for all stock.—*W. S. Palmer.*

In the following table are given, for the various sections of the Climate and Crop Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and

lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Summary of temperature and precipitation by sections, October, 1903.

Section.	Temperature—in degrees Fahrenheit.						Precipitation—in inches and hundredths.						
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.		
			Station.	Highest.	Date.	Station.			Lowest.	Date.	Station.	Amount.	Station.
Alabama.....	63.4	-0.6	{Hamilton.....	97	27	Valleyhead.....	22	25	1.82	-0.66	Cordova.....	4.36	Greenville, Ozark... 0.50
Arizona.....	64.2	-1.0	{Florence, Talladega.	97	31								
Arkansas.....	60.9	-1.3	{Aztec.....	103	17	Flagstaff.....	14	31	0.06	-0.61	Flagstaff.....	1.04	41 stations..... 0.00
California.....	64.0	+2.8	{Parker.....	103	17								
Colorado.....	48.2	+1.2	{Texarkana.....	97	2	Rison.....	26	24	2.21	-0.40	Wiggs.....	4.87	Helena, No. 1..... 0.24
Florida.....	70.8	-1.4	{Elsiuore.....	109	18	Brinkley.....	26	25			Upper Mattole.....	7.84	56 stations..... 0.00
Georgia.....	63.2	-0.7	{Blaine.....	94	10	Bodie.....	6	20, 26	0.49	-0.89	Boulder.....	3.43	Grover, San Luis..... 0.00
Idaho.....	49.1	+0.6	{Rockwell.....	93	6	Westcliffe.....	-4	31	0.90	-0.23			
Illinois.....	53.8	+0.6	{Brooksville.....	93	12	Sumner.....	29	25	1.82	-2.66	Wewahitchka.....	6.58	Fort Pierce..... 0.00
Indiana.....	55.0	+0.4	{Albany.....	95	7	Clayton, Diamond.....	25	28	2.06	-0.75	Greenbush.....	4.85	Griffin..... 0.44
Iowa.....	52.2	+0.3	{Blue lakes.....	86	18	Chesterfield.....	7	31	1.20		Murray.....	2.54	American Falls..... 0.19
Kansas.....	57.2	+0.5	{Garnet.....	86	10								
Kentucky.....	57.7	-0.5	{Benton, Cisne.....	91	3	Lanark.....	16	27	2.46	+0.04	Aledo.....	5.09	Antioch..... 0.80
Louisiana.....	66.1	-1.3	{Rome.....	95	3	Northfield, Richmond.....	18	27	2.68	+0.36	Washington.....	5.21	Topeka..... 0.59
Maryland and Delaware.....	56.7	+1.0	{Chariton.....	90	3	Earlham.....	16	27	1.95	-0.49	Harlan.....	4.50	St. Charles..... 0.32
Michigan.....	49.7	+1.4	{Hoxie.....	93	27	Achilles.....	17	26	3.63	+1.15	Burlington.....	8.02	Achilles..... 0.16
Minnesota.....	46.1	-1.5	{Eureka Ranch.....	93	19								
Mississippi.....	64.2	-0.1	{Beaver Dam.....	96	3	Loretto.....	19	28	2.22	+0.22	Alpha.....	4.65	Cadiz..... 0.95
Missouri.....	57.3	+0.3	{Oxford.....	95	3	Collinston.....	27	25	1.63	-1.10	Abbeville.....	4.68	Ruston..... T.
Montana.....	47.6	+3.2	{Charlotte Hall, Md.....	89	5	Oakland, Md.....	20	25, 31	4.19	+1.13	Pocomoke City, Md.....	9.63	Westernport, Md..... 1.58
Nebraska.....	53.4	+2.2	{South Haven.....	90	3	Baldwin.....	13	27	2.17	-0.52	Mackinac Island.....	5.88	Lake City..... 0.10
Nevada.....	51.0	+3.0	{Lynd (Rouse).....	81	19	Floodwood.....	12	27	3.13	+1.00	Pine River Dam.....	5.98	Albert Lea..... 1.45
New England*.....	50.1	-2.0	{Lake Como.....	98	1, 2, 4	Tupelo.....	22	25	1.12	-0.93	Walnut Grove.....	3.38	Okolona, Patmos..... 0.07
New Jersey.....	55.9	+1.1	{Marble Hill, St. Charles.....	90	3	Louisiana.....	19	27	2.85	+0.40	Ironton.....	6.38	Fairport, Princeton..... 1.11
New Mexico.....	53.4	-0.3	{Billings.....	85	20								
New York.....	50.4	+1.4	{Bartley, North Loup.....	93	27	Wolsey.....	11	30	0.47	-0.49	Marysville.....	1.47	Twin Bridges..... 0
North Carolina.....	59.0	-0.8	{Lynch.....	93	18	Agate.....	12	31	1.25	-0.24	Wadena.....	3.93	Lodgepole..... T.
North Dakota.....	47.0	+4.0	{Wabaska.....	90	24	Potts.....	11	29	0.29	-0.22	Morey.....	1.60	6 stations..... 0.00
Ohio.....	54.0	+0.6	{Hyannis, Mass.....	79	3								
Oklahoma and Indian Territories.....	61.2	-1.1	{Grove Beach.....	79	2	Morrisville, Vt.....	10	27	3.63	-0.01	Cream Hill, Conn.....	6.39	Turners Falls, Mass..... 1.69
Oregon.....	52.7	+1.2	{Norwalk and Waterbury, Conn.....	79	2								
Pennsylvania.....	53.4	+2.2	{Salen.....	86	2	Layton.....	24	25	8.92	+5.21	Paterson.....	16.19	Toms River..... 4.17
Porto Rico.....	78.3	-0.1	{Carlbad.....	99	10	Winsors.....	12	21	0.13	-0.95	Eagle Rock Ranch.....	1.87	18 stations..... 0.00
South Carolina.....	62.0	-1.2	{Cutchogue.....	80	27	Paul Smiths.....	2	28	5.89	+2.87	Salisbury Mills.....	14.63	Akron..... 1.46
South Dakota.....	51.5	+3.7	{Appleton.....	80	7	Linville.....	14	29	3.59	-0.02	Currituck Inlet.....	7.98	Mountairy..... 0.54
Tennessee.....	58.7	0.0	{Tarboro.....	91	5	Fargo.....	11	26	0.94	+0.02	Larimore.....	2.50	2 stations..... T.
Texas.....	65.5	-2.3	{Fort Yates.....	81	10	Coalton.....	15	27	2.62	+0.46	Pomeroy.....	5.47	Napoleon..... 1.11
Utah.....	50.3	+1.3	{Jamestown.....	81	11								
Virginia.....	56.9	-0.4	{Hanging Rock.....	93	4	Pawhuska.....	24	23	3.03	+0.42	Hartshorne, Ind. T.....	9.05	Marlow, Ind. T..... 0.20
Washington.....	50.8	+0.9	{Hennessy, Okla.....	95	8								
West Virginia.....	54.2	+0.5	{Eldorado, Okla.....	95	6	Beulah, Vale.....	14	30	2.45	-0.67	Glenora.....	12.18	Coyote..... 0.30
Wisconsin.....	48.2	+0.3	{Mangum, Okla.....	95	3, 4, 6	Dushore.....	20	25	4.64	+1.24	Milford.....	10.53	Beaver Dam..... 2.07
Wyoming.....	45.7	+2.2	{Coyote.....	93	6	Barros.....	52	8	8.20		La Carmalita b.....	16.30	Coamo..... 3.30
			{California.....	91	4	Clemson College.....	25	25	2.63	-0.25	Darlington.....	4.68	Calhoun Falls..... 0.86
			{Manati.....	97	12	Grand River School.....	10	23, 31	1.16	-0.04	Elk Point.....	3.90	Rosebud..... 0.15
			{Anderson.....	93	2	Hohenwald.....	16	25	1.82	-0.71	Yukon.....	4.32	Memphis..... 0.25
			{Rosebud.....	98	23	Rugby.....	16	28					
			{Liberty.....	97	3	Colorado, Menardville.....	27	24	2.45	+0.11	Runge.....	7.32	2 stations..... 0.00
			{Cotulla.....	100	2								
			{Green River.....	97	6	Ibapah.....	6	31	0.89	+0.13	Morgan.....	2.72	3 stations..... 0.00
			{Newport News.....	90	6	Burkes Garden.....	13	28	3.52	+0.16	Hampton.....	7.49	McDowell..... 0.65
			{Pomeroy.....	84	18	Wilbur.....	20	30	2.11	-0.35	Clearwater.....	10.95	Trinidad..... 0.00
			{Charleston.....	96	4	Cairo.....	15	27	2.55	+0.53	Terra Alta.....	4.75	Webster Springs..... 0.80
			{Brodhead, Racine.....	82	3	Easton, Spooner.....	17	27	2.40	-0.14	Hayward.....	4.95	Hillsboro..... 0.82
			{Appleton Marsh.....	82	15								
			{Phillips.....	83	9	South Pass City.....	8	31	0.74	-0.24	Bedford.....	2.27	Lusk..... 0.00
			{Tensleep.....	83	10								

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

SPECIAL CONTRIBUTIONS.

SOLAR RADIATION AND EARTH TEMPERATURES.

By C. G. KNOTT, Professor, University of Edinburgh, dated January, 1901. Reprinted from the Proceedings of the Royal Society of Edinburgh, Vol. XXIII, pp. 296-311.

At a recent meeting of the Society, Doctor Buchan read a paper based on certain observations of the temperature of the waters of the Mediterranean, which had been made by the staff of the Austrian ship *Pola*. These indicated that the direct effect of solar radiation was felt to a depth of over 150 feet. At any rate, the facts were that the temperature of the upper stratum of water of this thickness was perceptibly higher at about 4 p. m. than at 8 a. m., and that the difference was about 1.5° F., or 0.8° C., at the surface, diminishing fairly steadily

to value zero at a depth of fully 150 feet, or 50 meters. It may easily be calculated that this excess of temperature at the afternoon hour means the accumulation of an amount of heat equal to 1460 units in every column of water 1 square centimeter in section; and this is accomplished within the eight hours from 8 a. m. to 4 p. m. It must be noted that this accumulation of heat is a daily occurrence.

The whole process of the heating and cooling of any portion of the earth's surface is a very complicated one. Doubtless there is constant radiation into space going on steadily day and night. During the day the solar energy enters the atmosphere and part of it reaches the earth's surface, heating the matter